**AKSIOMA**: Jurnal Program Studi Pendidikan Matematika
Volume 12, No. 2, 2023, 2112-2122

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v12i2.7200

# PROBLEM-BASED LEARNING MODEL MANAGEMENT ON THE INTEREST IN LEARNING MATHEMATHICS OF ELEMENTARY SCHOOL STUDENT

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*Received 30 January 2023; Received in revised form 22 April 2023; Accepted 17 June 2023*

## *Abstract*

*The Problem Based Learning (PBL) model can be applied to elementary mathematics learning. This study aims to analyze the factors of student interest, the learning process, and the applications of PBL in elementary school mathematics learning. The research used qualitative method with a case study approach. The research subjects were students and teachers of class V SD Negeri 1 Bengkal. Researchers collected data through structured interviews with mathematics teachers, filling out 15 student questionnaires, learning observations, and photo, audio, and video documentation. Miles and Huberman's model analysis techniques include data reduction, data presentation, and conclusions. Design of data validity with credibility test and confirmability test. The credibility test uses methods of increasing research persistence, technique triangulation, and member check. The Confirmability test uses journals to reflect data. Research findings (1) two factors influence interest in learning, namely internal and external factors in mathematics leaning. (2) The learning process of the PBL model in mathematics leaning is student-oriented. (3) Learning with the PBL model has advantages, including increasing learning motivation; improving student academic achievement; improving the ability to collaborate, work together and communicate.*

***Keywords**: Elementary School; interest in learning; mathematics learning process; problem based learning.*

## *Abstrak*

*Model pembelajaran Problem Based Learning (PBL) dapat diterapkan pada pembelajaran matematika Sekolah Dasar. Penelitian ini bertujuan untuk mendeskripsikan faktor minat siswa pada pembelajaran matematika, proses pembelajaran matematika, dan penerapan model pembelajaran Problem Based Learning (PBL) pada pembelajaran Matematika. Penelitian ini menggunakan metode deskriptif kualitatif dengan pendekatan studi kasus. Subjek dari penelitian ini adalah siswa dan guru kelas V SD Negeri 1 Bengkal. Peneliti mengumpulkan data melalui wawancara terstruktur dengan guru matematika kelas V, pengisian angket oleh 15 siswa kelas V, dua kali pengamatan proses pembelajaran, dan dokumentasi berupa foto, audio, dan video. Teknik analisis data yang digunakan peneliti ialah model Miles dan Hubermen yang meliputi reduksi data (data reduction), penyajian data (data display), dan penarikan simpulan. Teknik keabsahan data peneliti menggunakan uji credibility dan uji confirmability. Pada uji kredibilitas data, peneliti menggunakan cara peningkatan ketekunan dalam penelitian, triangulasi, dan membercheck. Uji confirmability dilakukan dengan menggunakan jurnal untuk merefleksi data yang dikumpulkan. Temuan dari penelitian ini adalah (1) Terdapat 2 faktor yang mempengaruhi minat belajar matematika kelas V yaitu faktor internal dan eksternal pada pembelajaran matematika. (2) Proses pembelajaran matematika kelas V menggunakan model PBL berorientasi pada siswa. (3) Pada pembelajaran matematika kelas V guru menggunakan model pembelajaran PBL karena memiliki kelebihan diantaranya: meningkatkan motivasi belajar; meningkatkan pencapaian akademik siswa; meningkatkan kemampuan berkolaborasi dan bekerja sama serta berkomunikasi.*

***Kata kunci:** Sekolah Dasar; Minat belajar; Proses pembelajaran matematika; Problem Based Learning.*

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm

## INTRODUCTION

Education has a very strategic meaning in building a generation of quality students. Therefore, quality education is needed to realize superior and competitive human resources. The educational process is in the form of distributing knowledge and information, which is carried through learning. Based on this, education must prepare effective learning to foster interest in learning in students. Interest is a driving thing that comes from within each person or something that causes attention or interest effectively so that a fun activity is chosen that also brings satisfaction to him. Learning interest in students is closely related to character, motivation, self-expression, and external influences such as the environment. Interest is essential in learning in the world of education at school (Sholehah et al., 2018) because interest will make students follow learning thoughtfully and attentively. So that the learning process will run smoothly and optimally if students have a high interest in education.

Mathematics learning in elementary schools aims to equip students with practical mathematical skills for continuation at a higher level and also for daily lives. Mathematics is a subject that considers it necessary for students to have logical, critical, persistent, and innovative thoughts and ideas, so students who study mathematics are expected to have these characteristics.

In learning mathematics, teachers must pay attention to several things, for example, enthusiastic teaching methods, explanations of the material according to the characteristics of students, using media, and learning that makes students active and appropriate activities to achieve learning objectives.

Teachers can use much learning in the learning process to effectively increase student interest in education and achieve appropriate learning objectives. One of them is the Problem Based Learning (PBL) model. The Problem Based Learning model can develop students' critical thinking skills in solving problems given by the teacher and foster student motivation in learning (Fauzia, 2018). The Problem Based Learning model can use as an alternative in learning mathematics so that lessons are not passive and monotonous. The PBL learning model can also affect interest in the mathematics learning process.

The Problem Based Learning model emphasizes problem-solving activities in learning. The process of learning mathematics using the PBL model is expected to attract students to be actively involved in learning and increase student interest in learning.

Acording to the fifth-grade teacher in SD Negeri 1 Bengkal and based on the students scores dokument, it was found that students interest in learning mathematics was still lacking. When learning takes place there are students who pay attantions well or not. There are also students who are less enthusiastic in participating in learning. This is different from the research by Sholehah (2018) entitled “Students interest in learning mathemathics in class 4 SD Negeri Karangroto 4 Semarang”. It was found that in the learning process students were very enthusiastic about following the material provided by the teacher so that students had an interest in learning which was categorized as very high in learning mathematics.

In this study, there are three main objectives, including analyzing (1) the factors that influence fifth-grade

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v12i2.7200

students' interest in learning mathematics, (2) the mathematics learning process in fifth-grade class, and (3) the reasons of teachers use PBL learning model for mathematics learning in fifth-grade class.

## METHOD

The type used in this study is a qualitative descriptive method with a case study approach. Qualitative research examines the condition of objects naturally, in which the critical instrument of this research is the researcher (Harahap, 2020). In this study, directly involved in the data collection process. This approach is used to understand the situation in depth regarding the factors that influence student interest in learning, the learning process, and the use of PBL mathematics learning models in fifth-grade. The research was carried out in fifth-grade of SD Negeri 1 Bengkal, Kranggan District, Temanggung. The study involved mathematics teachers and fifth-grade students.

The data collection techniques of this research are interviews, questionnaires, observation, and documentation. This research used semi-structured inter-views. The researcher wrote questions systematically as an interview instru-ment. Interviews were conducted with the fifth-grade mathematics teacher. Thisresearch used a closed questionnaire to help respondents answer quickly. A closed questionnaire was addressed to 15 students of fifth-grade. This questionnaire was used to reveal data in the form of factors influencing students' interest in learning mathematics from fifth-grade student informants. Researchers carried out research using non-participant observation, where researchers did not play a direct role in the learning process but only observed. Things that were observed included:

- The continuity of the learning process in SD Negeri 1 Bengkal.
- Starting from the initial core and final activities.
- The class condition and the surrounding environment.

This research use documentation in the form of photos and videos related to the mathematics learning process using the PBL model and the state of the elementary school environment, videos of the learning process, and audio interviews.

The research analyzed data to determine the factors of interest in learning process using the PBL model from data collection techniques that researchers have implemented. The data analysis technique of this research is the Miles and Huberman model, which is divided into three activity lines, namely data reduction, (2) data presentation, and (3) conclusion (Hardani et al., 2020). Data reduction takes place continuously during data collection. This study reduces the research data in the form of interviews, questionnaires, observations, and documentation regarding the factors of student interest in learning mathematics and the process of learning mathematics in fifth-grade. The next step after data reduction is to present the data. This study will present data from interviews, questionnaires, observations, and documentation in brief descriptions, charts, relationships between categories, and drafts. The last step the researcher took was concluding and verifying. Researchers make conclusions after getting valid and consistent evidence in the field.

The data validity technique the research uses is the credibility test and the confirmability test. This research used increasing research persistence,

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm

triangulation, and member-checking methods in the credibility test. The researcher checked data obtained regarding factors that influenced students' interest in learning mathe-matics and the process for fifth-grade by reading research results and documents related to the outcomes studied. So that they could use them to check whether the data found were correct and reliable or not. The triangulation used in this research is technical. Triangulation techniques to test the credibility of the data are done by checking the data to the same source with different methods, including observation, interviews, questionnaires, and documentation. In this study, the researchers conducted technical triangulation on the fifth-grade mathematics teacher informants through interviews, observations, and documentation.

Meanwhile, for fifth-grade students, technical triangulation was carried out through questionnaires, observations, and documentation. The researchers performed the member check after data collection was completed and concluded. The researcher conveys his findings to the data provider. The Confirmability test is carried out by processing all the data obtained to determine the certainty and quality of the data obtained. In this study, the researchers tested the analysis results associated with the process. Researchers also use journals to reflect on the data collected. If the research results are a function of the research process, the research has met the confirmability standard.

## RESULT AND DISCUSSION

The results of the research on the application of the PBL model in influencing the interest in learning mathematics of elementary school students include (1) the factors that influence fifth-grade students' interest in learning mathe-matics, (2) the mathe-matics learning process in fifth-grade class, and (3) the reasons of teachers use PBL learning model for mathematics learning in fifth-grade class.

### Factors that influence students' interest in learning mathematics in fifth-grade

#### 1. Internal factors

Internal factors that influence interest are factors from within students (Subekti et al., 2021) which consist of physical aspects related to physical conditions. Student learning readiness and psychological aspects related to mental conditions and concentration of students' minds in receiving and completing assignments at school math subjects. This internal factor comes from within the 5th-grade students of SD Negeri 1 Bengkal. Student internal factors are the most critical factors that affect student learning interests (Korompot et al., 2020).

**- Physical factors**

Physical factors are in the form of health factors and physical disability factors. Each student's health condition is different. All 5th-grade students of SD Negeri 1 Bengkal are in good health and have no physical disabilities. Good physical condition in students will affect interest in learning and support learning success. Because if there is a physical health disorder, for example, the sense of sight and hearing, it will cause a decrease in interest in learning. This physical factor will affect the enthusiasm and intensity of students' learning in participating in mathematics lessons in grade 5. So if students have a good body, then the attitude of students in participating in mathematics learning is also good.

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v12i2.7200

**- Psychological factors**

Psychological factors in the form of intelligence, attention, talent, maturity, and readiness have a significant impact on interest. Students must pay attention to the material being studied to be interested in learning. Interest in learning will be shown by children when facing learning. Based on the 5th-grade student questionnaire of SD Negeri 1 Bengkal, it is known that mathematics is not an easy subject. However, students can follow the lesson well. Learning is also student-centered, and teachers must create a pleasant and happy psychological atmosphere to maintain students' physical and psychological conditions (Korompot et al., 2020).

- **Motivation**

Grade 5 students of SD Negeri 1 Bengkal lack the motivation to learn even though students have a curiosity about mathematics. The teacher also taught well and gave full attention to the students. Students also have pleasure in how they learn, and some enjoy reading, listening to the teacher's explanations, singing, or in a quiet atmosphere. Good study habits arise from within the individual if there is a will to do so. So that students can study well, they must know efficient ways of learning (S. F. N. Aini & Setiawan, 2018). According to 5th-grade students of SD Negeri 1 Bengkal, mathematics is not an easy subject. Students' attitudes toward subjects can encourage them to learn. So with this assumption, it will result in 5th-grade students of SD Negeri 1 Bengkal lacking high learning motivation in mathematics lessons (Aini, 2018).

**2. External factors**

External factors consist of family and school environment.

**- Family**

As the first education for students, the family of 5th-grade students of SD Negeri 1 Bengkal, plays an essential role in influencing students' interest in learning. Covers include the atmosphere at home, how parents educate their children, parental attention, and others. The influence given by the family scope that can affect students' interest in learning mathematics is parental attention. Such as completing students' mathematics learning facilities, asking whether students have assignments or homework after school, and other attention in the form of reprimands if students do not study at home (Sarah et al., 2021). Also, family members' relationships can encourage students to be enthusiastic about learning. Parents who take the time to help students when students have difficulty doing homework make student-and-parent relationships good. Incompatibility in the family can cause emotional stress, anxiety, and a child's lack of interest in learning. The house's atmosphere must support children's learning, and neatness and tranquility in the house must be maintained (Fuad & Zuraini, 2016).

**- School**

School factors include how teachers teach, learning materials, methods, models, and other things that happen in schools. The school environment is an external factor affecting student learning (Muliani & Arusman, 2022). In class 5, mathematics learning at SD Negeri 1 Bengkal, the teacher has used models, methods, and learning resource materials to make it easier for students to understand learning materials well. In the teaching and learning process, the teacher plays an essential role in helping increase interest in learning at school. Additional learning resource materials

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm

are reference materials used by students and teachers to deepen their love of subjects and to strengthen, master, or enrich learning in various fields of study (Ramos, 2022). Additional learning resource materials can be in the form of learning media. Learning media can help grade 5 teachers enrich students' knowledge and stimulate students in the learning process. The atmosphere outside the 5th grade of SD Negeri 1 Bengkal is calm and comfortable because each class also learns in their respective classes, although sometimes there is vehicle noise. After all, it is close to the road. Teachers must create a fun and exciting learning atmosphere to make students comfortable learning mathematics (Malini et al., 2019).

This is in line with research by Bela Bekti Amallia Putri, Arifin Muslim, and Tri Yuliansyah Bintaro (2019) pages 68-74 entitled "Factor analysis of the low interest in learning mathematics for fifth-grade at SDN 4 Gumiwang". The result show that the factors that influence the low interest in learning mathematics for fifth-grade students include internal and external factors which include physiological and psychological aspect, as well as the way of teaching teachers, attention and ways of educating parents, as well as facilities in learning.

**Class V Math Learning Process**

The teaching and learning process is a process that contains a series of teacher and student actions based on reciprocal relationships that take place in educational situations to achieve learning objectives So it is expected that teachers and students work together to make the learning situation conducive and comfortable so that the teaching and learning process runs according to the goals determined. Teachers have a significant role in the learning process (Sutikno, 2021). The 5th-grade math teacher conditions students for active learning so that students' potential can develop optimally.

An exciting learning process is the best method for teachers (Zou et al., 2022). Students can follow the learning well and improve students inquiry and innovation abilities. In class 5 mathematics learning at SD Negeri 1 Bengkal, the teacher uses the lecture, discussion, question and answer, and assignment methods. At the time of the discussion, students were given assignments in groups to do the assignments given by the teacher. Students are grouped randomly based on their abilities. Another way to teach mathematics is during lessons; the teacher transfers students who are strong in mathematics to students who are weak, giving them one task for two (Ibrakhimovich & Furqatjon qizi, 2022). So students will work in teams, and there will be discussions to complete assignments. Teachers' teaching can also be conceptualized as closely related to student outcomes (Bl¨omeke et al., 2022). Thus, it is necessary to have a good teacher's teaching competence so that students easily understand the learning material, which causes maximum student learning outcomes.

The process of learning mathematics for grade 5 at SD Negeri 1 Bengkal uses a problem-based learning model involving students in problem-solving. As in Singapore, mathematics teaching methods provide opportunities for students to achieve the skills needed to live in the 21st century (Mehrjoo et al., 2022). When students engage in problem-solving, reasoning, critical thinking, and communication, they find different ways to solve problems and demonstrate them in the real world.

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v12i2.7200

Teachers must be professional in developing the teaching and learning process considering the rapid advances in technology and science (Farihin et al., 2022). So that teachers are required to have teaching skills so that learning can run efficiently and according to learning objectives. Seeking teacher skills in teaching in the classroom can also foster student interest in learning (Malini et al., 2019). There are several basic skills that teachers must possess to teach students. The following are the teacher's teaching skills in 5th-grade mathematics learning at SD Negeri 1 Bengkal, namely opening and closing lessons, explaining skills, variation skills, reinforcement skills, questioning skills, classroom management skills, small group and individual teaching skills, and skills guiding small group discussions.

Teaching skills are essential for teachers because they help students understand lessons and achieve learning achievements. The students in schools whose teachers are given professional mathematical development have excellent mathematics learning achievement (Brendefur et al., 2022). So if the teacher has a profession in teaching mathematics, it will improve student learning outcomes.

**The use of the Problem Based Learning model in learning mathematics for class V**

The learning model used in 5th-grade mathematics learning at SD Negeri 1 Bengkal is the PBL model. The PBL model can develop students' critical thinking skills in solving problems given by the teacher and foster student motivation in learning (Fauzia, 2018). The PBL model can be used as an alternative in learning mathematics so that lessons are not passive and monotonous. The PBL model teaching method updated traditional teaching methods and aroused students' interest in learning in new environments (Li et al., 2022). Because interest is essential in learning, the main objective of the curriculum is to cultivate students' interest in studying science and technology, further utilize their experience in instructional instruction and develop their ability to integrate interdisciplinary knowledge and skills (Lu1 et al., 2021).

The PBL learning model is a learning model that focuses on students and relevant problems to be solved using their knowledge and other sources. The PBL model begins with a problem to collect new knowledge and skills needed for the problem. The 5th-grade math teacher at SD Negeri 1 Bengkal only acts as a facilitator. In the PBL model, students are required to be independent in solving existing problems so that students can think critically, which can develop their thinking skills (Setiyawan, 2017). The 5th-grade teacher of SD Negeri 1 Bengkal has implemented the PBL learning model, although it is still simple. Because the use of the PBL model also requires preparation. The use of PBL model can be used to improve students' thinking skills and provide permanent lessons, but the preparation and practice of this model are time-consuming (Ari & Katranci, 2014).

Learning using the PBL model makes it easier for students to move actively to acquire knowledge independently. So, student involvement can be an important reason for using PBL. Some teachers report that incorporating PBL into the curriculum helps them teach content knowledge and skills more effectively (Martinez,

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm

2022). PBL, especially in learning mathematics, is used to develop practical thinking skills, problem-solving skills, and independent learning (Sutarto et al., 2022). Teachers use this learning model because it has several advantages, including:

**1. Increase learning motivation**

In learning with the PBL model, 5th-grade students of SD Negeri 1 Bengkal are actively involved and can solve complex problems to increase their learning motivation. Students follow the lessons from the teacher well by interacting with the teacher and learning mathematics in 5th grade at SD Negeri 1 Bengkal. The teacher involves students to play an active role in finding learning resources and using learning media provided by the teacher so that students have the motivation and dare to come forward to operate the learning media and present the results of group discussions. The PBL model can facilitate students to play an active role in learning to increase students' learning motivation (Wahyuningtyas, 2021). Learning motivation is an essential factor in the learning process. In such a teaching process, students become self-motivated and focus on specific goals while trying to recognize and solve problems (Gürses et al., 2022).

**2. Improving student academic achievement**

In the PBL learning model, problems arise as the first step in collecting and integrating new knowledge. So the application of the PBL model with concrete media can be an effort to improve mathematics learning outcomes (Fauzia, 2018). With the use of the PBL learning model in 5th-grade mathematics learning at SD Negeri 1 Bengkal, the student's score exceeds the KKM. Based on the value data, it shows that with the use of the PBL learning model, student learning outcomes exceed the KKM. Applying the problem-based learning model (PBL) can improve the mathematics learning outcomes of 6th-grade students of SD Negeri Jatinom, Klaten (A. K. Aini & Muhtadi, 2022).

**3. Improve the ability to collaborate and work together and communicate**

In the mathematics learning process at SD Negeri 1 Bengkal, which applies problem-based learning (PBL), grade 5 students work in teams (groups) to solve problems by conducting group discussions. Students are formed into several groups, with 3-5 students in their groups. So that by using this PBL model can maximize student involvement and activeness in the teaching and learning process to achieve learning objectives. Therefore, group members need collaboration, cooperation, and good communication to achieve learning objectives. In learning using the PBL model, the problems developed have an essential role as an initiator and intensifier of learning and active participation of students (Gürses et al., 2022). So that students can play an active role in learning.

The result of this study support the various theories and result previous studies that umderlie them. Based on the result of the study it was found that the factors of students interest in learning consisted of internal and external factors that had an influence on the learning interest of students in fifth-grade elementary school 1 Bengkal. Good **s**tudents interest in learning is grown from within sudents with good

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v12i2.7200

physical and psycological factors and motivation to learn. The use of the PBL model also affects students learning outcomes at Elementary scool of 1 Bengkal.

## CONCLUSIONS AND SUGGEST

This research shows that two factors influence the interest in learning mathematics in grade 5 SD Negeri 1 Bengkal, namely internal and external factors. Internal factors come from students in the form of physical, psychological, and motivational factors. Meanwhile, external factors come from outside the students in the form of family and school environment factors. The 5th-grade mathematics learning process uses a student-oriented PBL (Problem-Based Learning) model. In grade 5 mathematics learning at SD Negeri 1 Bengkal, the teacher uses the PBL learning model because it has several advantages, including increasing learning motivation, improving student academic achievement, and collaborating and communicating. To improve mathematics learning outcomes, teachers can use attention to students' internal and external factors for evaluation. In addition, teachers can use research findings to improvise students for the mathematics learning process.

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